

### REMARKS

Claims 1-29 and 31-34 are currently pending in the subject application. Applicants' representative thanks the Examiner for courtesies extended during the teleconference on Friday January 23, regarding submission of cited art and novel aspects of the subject innovation.

The subject innovation relates to optimizing distribution of data (*e.g.*, broadcasting of non-streamed data), by employing an ellipsoid method in conjunction with an approximate separation oracle in computer implemented machines/systems. For example, the subject innovation can maximize update speed of nodes by analyzing associated sub-networks through which a broadcaster routes data, *via* employing the ellipsoidal method having an approximate separation oracle. Such nodes can represent corresponding terminals or points of interactions (*e.g.*, computer terminals, servers) in a computing network. Likewise, respective edges associated therewith can represent ways in which items/entities are transferred from one node to another.

In one aspect, systems and methods are claimed that exploit solutions to dual linear programs for optimizing networks, wherein such networks were conventionally burdensome to optimize (*e.g.*, complexities arising from varying capacity of the links between the source and receiving nodes.) For example, conventional challenges in solving dual linear program associated with a Steiner tree packing problem can arise from the separation oracle - (classifier that indicates whether a solution is feasible or not) – for the dual linear program, which represents a nondeterministic polynomial-time hard (NP-hard) to solve. The subject invention, in-part employs known approximation methods for the Steiner tree problem as an *approximate separation oracle* in an ellipsoid method to find an approximate fractional packing of Steiner trees, and implements such features in a computer executable system for optimizing data distribution.

The following references are enclosed herewith, which collectively provide background material for modeling of network systems/distributions

1. A. Martin and R. Weistmantel; Packing Paths and Steiner Trees: Routing of Electronic Circuits; CWI Quarterly; 6:185-204; 1993.
2. M. Grotschel, A. Martin, and R. Weistmantel; The Steiner Tree Packing Problem in VLSI-Design; Mathematical Programming; 78:265-281; 1997.

3. M. Grotschel, A. Martin, and R. Weismantel; Packing Steiner Trees: A Cutting Plane Algorithm and Computational Results; *Mathematical Programming*; 72:125-145; 1996.
4. C. St. J. A. Nash-Williams; Edge Disjoint-Spanning Trees of Finite Graphs; *J Lond Math. Soc.*; 36:445-450; 1961.
5. W. T. Tutte; On the problem of Decomposing a Graph into  $n$  Connected Factors; *J Lond Math. Soc.*; 36:221-230; 1961.
6. P.M. Vaidya; Geometry Helps in Matching; *SIAM J Comput.*; 18:1201-1225; 1989.
7. B. Carr and S. Vempala; Randomized Meta-Rounding; *Proc. Of the 32.sup.nd ACM Symposium on the Theory of Computing (STOC '00)*; 2000).
8. S. Hougardy and H.J. Promel; A 1.598 Approximation Algorithm for the Steiner Problem in Graphs; *Proc. Of 10.sup.th ACM-SIAM Symp. On Disc. Alg. (SODA)*; pages 448-453, 1999.
9. J. Bang-Jensen, A. Frank, and B. Jackson; Preserving and Increasing Local Edge-Connectivity in Mixed Graphs; *SIAM J. Discrete Math.*; 8(2):155-178; 1995.

Moreover, applicants' representative continues a search for the cited references of "K. Menger, *Zur Allgemeinen Kurventheorie*; *Fund. Math.*; 10:95-115; 1927" and "*M.Bern and P. Plassman*; The Steiner Problem With Edge Lengths 1 And 2; *Information Processing Letters*; 32(4): 171-176; 1989."

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP489US].

Should the Examiner believe a telephone interview is necessary, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

AMIN, TUROC & CALVIN, LLP

/Seyed Vahid Sharifi Takieh/

Seyed Vahid Sharifi Takieh

Reg. No. 45,828

AMIN, TUROC & CALVIN, LLP  
127 Public Square  
57<sup>th</sup> Floor, Key Tower  
Cleveland, Ohio 44114  
Telephone (216) 696-8730  
Facsimile (216) 696-8731